इंटरनेट मानक

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IS 8598 (1987): Specification for Idlers and Idler Sets for Belt Conveyors [MED 6: Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment]

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Indian Standard

(Reaffirmed 1998)

SPECIFICATION FOR IDLERS AND IDLER SETS FOR BELT CONVEYORS

(First Revision)

1. Scope — Covers the requirements for carrying and return idlers and idler sets up to and including three idlers for belt conveyors.

1.1 It does not cover idlers and idler sets for portable and mobile belt conveyors. Garland, catenary and impact, and transition idlers are also not covered by this standard.

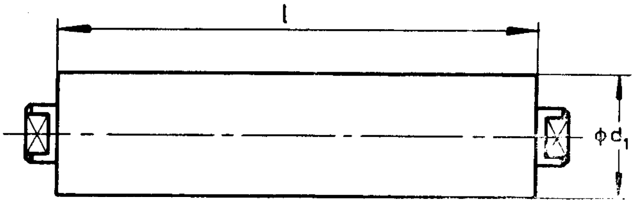
2. Terminology — Shall be according to IS : 4240-1984 'Glossary of conveyor terms and definitions (*first revision*)'.

2.1 *Troughing Angle* (λ) — Angle of the axis of side idlers from the horizontal.

2.2 *Idler Vertical Clearance* (m) — The vertical gap between the periphery of idler and the top of the idler transom or any other structural part, nearest to the idler.

3. Dimensions

3.1 *Idler Diameters* (d_1) — The diameters, d_1 in millimetres, of carrying and return idlers shall be selected from the following:



Carrying and Return Idlers													Carrying Idlers Only
63·5	76·1	88·9	101·6	108	114·3	127	133	139·7	152·4	159	168·3	193·7	219·1

3.2 *Idler Lengths* — Idlers shall have lengths as specified in Table1.

3.3 *Idler Sets* — Mounting dimensions for idler sets shall be as specified in Table 2.

3.3.1 *Length of carrying idlers* — The length of carrying idlers suitable for troughed belt on three equal idlers shall be selected from those given in Table 1.

3.3.2 *Slots for bolts* — Slots (*SL*) for bolts of diameter *D* shall be of width *D* + 2 mm, *Min* and 25 mm, *Min*, long in the longitudinal direction along the length of conveyor (*see* Fig. in Table 2).

3.3.3 *Clearance height* (m) — The clearance beneath centre idler for carrying idler sets shall be as given below:

All dimensions in millimetres.

Carrying Idler Diameter d_1*	63·5	76·1	88·9	101·6	108	114·3	127	133	139·7	152·4	159	168·3	193·7	219·1
Minimum Clearance m†	30	30	30	30	30	30	30	40	40	40	40	40	50	60

**See* 3.1.

†*See* 3.3.

Adopted 18 December 1987 | © September 1988, BIS | Gr 4

BUREAU OF INDIAN STANDARDS
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Conveyors, Vertical Hoists and Bucket Elevators Sectional Committee, EDC 61; Belt Conveyors Subcommittee, EDC 61 : 1 [Ref : Doc : EDC 61 (3785)]

TABLE 1 IDLER LENGTHS

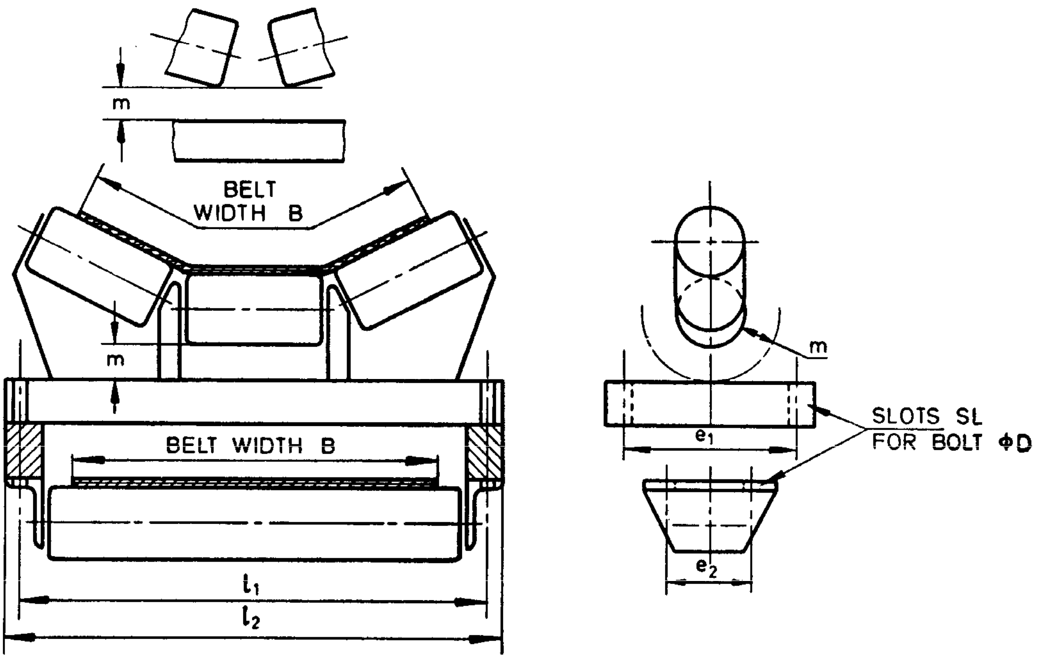
(*Clauses* 3.2, 3.3.1, and *Fig. under* 3.1)

	Carrying and Return Idlers													Carrying Idlers Only
Idler dia, d_1	3·56	76·1	88·9	101·6	108	114·3	127	133	139·7	152·4	159	168·3	193·7	219·1
LENGTH, l														
100	×	×	×	×	×									
150	×	×	×	×	×									
160	×	×	×	×	×									
190	×	×	×	×	×	×	×	×	×					
200	×	×	×	×	×	×	×	×	×					
235	×	×	×	×	×	×	×	×	×					
250	×	×	×	×	×	×	×	×	×					
290	×	×	×	×	×	×	×	×	×					
315	×	×	×	×	×	×	×	×	×	×	×	×		
350	×	×	×	×	×	×	×	×	×	×	×	×		
380	×	×	×	×	×	×	×	×	×	×	×	×		
400	×	×	×	×	×	×	×	×	×	×	×	×		
415	×	×	×	×	×	×	×	×	×	×	×	×		
465	×	×	×	×	×	×	×	×	×	×	×	×		
500	×	×	×	×	×	×	×	×	×	×	×	×		
530	×	×	×	×	×	×	×	×	×	×	×	×		
550	×	×	×	×	×	×	×	×	×	×	×	×		
600	×	×	×	×	×	×	×	×	×	×	×	×		
625	×	×	×	×	×	×	×	×	×	×	×	×		
670	×	×	×	×	×	×	×	×	×	×	×	×		
700	×	×	×	×	×	×	×	×	×	×	×	×		
710	×	×	×	×	×	×	×	×	×	×	×	×		
750	×	×	×	×	×	×	×	×	×	×	×	×	×	
800	×	×	×	×	×	×	×	×	×	×	×	×	×	
850	×	×	×	×	×	×	×	×	×	×	×	×	×	
900	×	×	×	×	×	×	×	×	×	×	×	×	×	
950	×	×	×	×	×	×	×	×	×	×	×	×	×	
1 000	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 050	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 100	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 120	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 150	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 200	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 250	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 400	×	×	×	×	×	×	×	×	×	×	×	×	×	×
1 500			×	×	×	×	×	×	×	×	×	×	×	×
1 600			×	×	×	×	×	×	×	×	×	×	×	×
1 700			×	×	×	×	×	×	×	×	×	×	×	×
1 800						×	×	×	×	×	×	×	×	×
2 000						×	×	×	×	×	×	×	×	×
2 200						×	×	×	×	×	×	×	×	×

TABLE 2 MOUNTING DIMENSIONS FOR IDLERS

(*Clauses* 3.3 *and* 3.3.2)

All dimensions in millimetres.



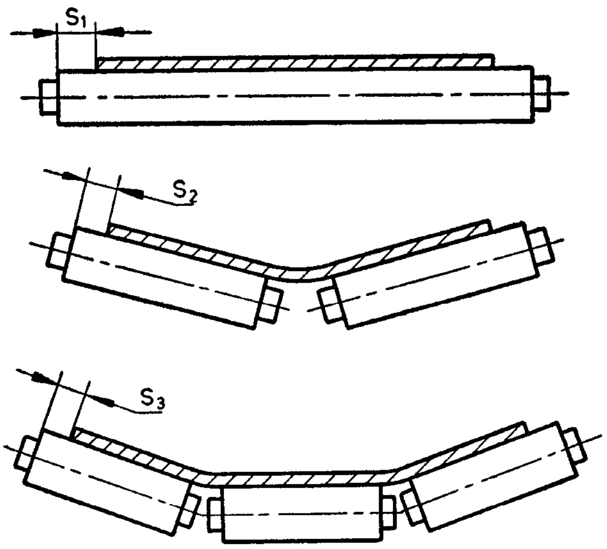
Belt Width *B*	l_1	l_2	e_1	e_2		*D*
				Shape *M*	Shape *N*	
400	690	755	200	65	100	M12
500	790	855	200	65	100	M12
650	940	1 000	200	65	100	M12
800	1 090	1 150	200	65	100	M12
1 000	1 290	1 350	200	65	100	M12
1 200	1 490	1 560	200	65	100	M16
1 400	1 690	1 750	200	65	100	M16
1 600	1 900	1 950	200	65	100	M16
1 800	2 100	2 150	200	65	100	M20
2 000	2 300	2 350	200	65	100	M20

Note — Other dimensions may be used if mutually agreed to by the purchaser and the manufacturer. For *m*, *see* **3.3.3**.

3.3.4 *Edge clearance* — shall be as given in Table 3.

TABLE 3 EDGE CLEARANCE

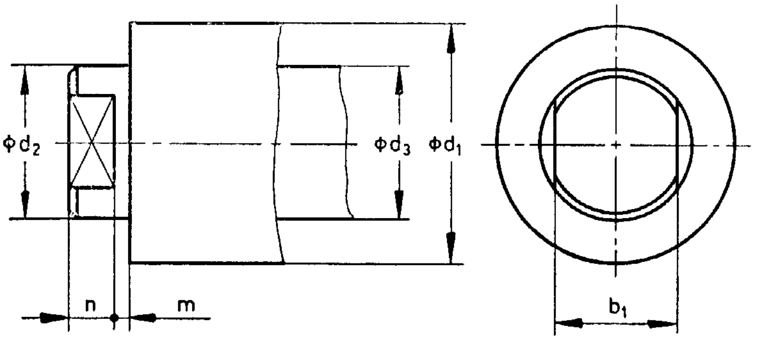
All dimensions in millimetres.



Belt Width	Edge Clearance		
B	S_1	S_2	S_3
400	50	40	35
500	50	40	40
650	50	55	50
800	75	65	70
1 000	75	75	70
1 200	100	100	100
1 400	100	100	100
1 600	100	100	100
1 800	100	100	100
2 000	100	100	100

3.4 *Spindle Ends*

3.4.1 *Type* A *spindle end without added end cap*

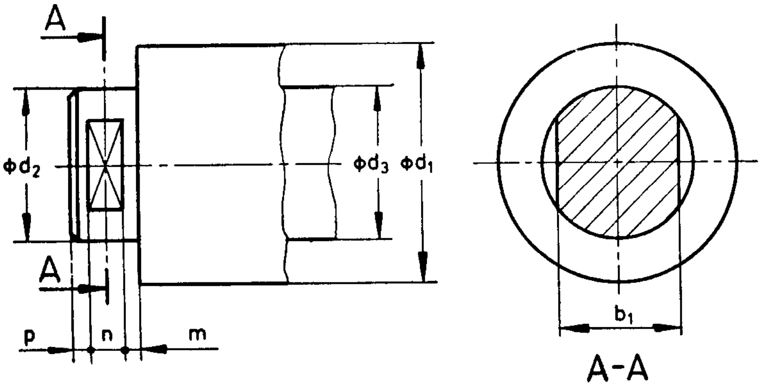


All dimensions in millimetres.

d_2	d_3	b_1	m	n*
20	20	14	4	9
25	25	18	4	12
30	30	22	4	12
40	40	32	4	12

*For return idlers, $n+10$ is permissible.

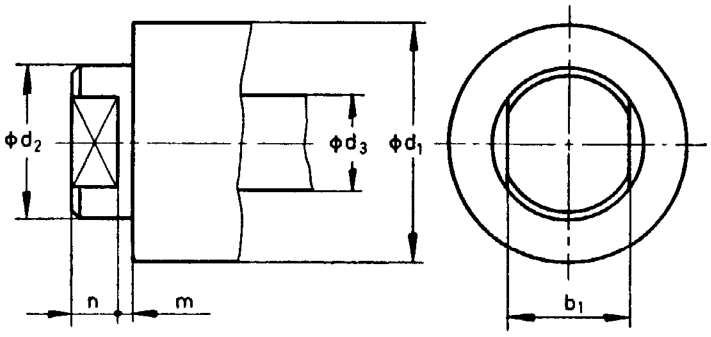
3.4.2 *Type* B *spindle end without added end cap*



All dimensions in millimetres.

d_2	d_3	b_1	m	n	p
20	20	14	4	9	5
25	25	18	4	9	5
30	30	22	4	9	5
40	40	32	4	9	5

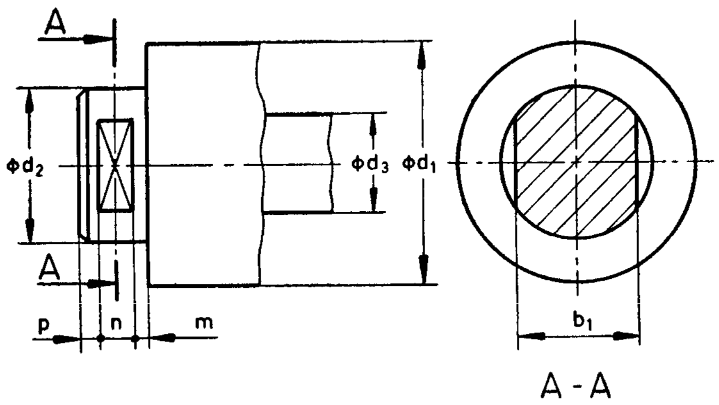
3.4.3 *Type* C *spindle end with added end cap*



All dimensions in millimetres.

d_2	d_3	b_1	m	n
35	20	28	4	10
40	25	32	4	12
45	30	38	4	12

3.4.4 *Type D spindle end with added end cap*



All dimensions in millimetres.

d_2	d_3	b_1	m	n	p
35 40 45	20 25 30	28 32 38	4 4 4	9 9 9	5 5 5

3.4.5 Idlers with one shot lubrication may have special shaft ends suitable for the purpose.

3.4.6 Impact idlers and troughing training idlers shall have spindle ends similar to those of troughing idlers and shall conform to **3.4.1** to **3.4.4**. The return training idlers shall have ends similar to return idlers.

4. Requirements

4.1 *Troughing Angle* (λ) — The value of the troughing angle λ shall be selected from those given below for all standard widths of belts:

15°	20°	25°	30°	35°	40°	50°

Note 1 — The user shall satisfy himself that the belt shall trough adequately on idler set.

Note 2 — The troughing angle of 15° shall be used for idler sets of *N* shape (*see* **5.1**).

4.2 *Troughing Angle of Return Idlers* — The value of troughing angle of rollers of return idlers shall be selected out of 0°, 10° and 15° for all standard widths of belts.

Note — Vee-return idlers with 10° or 15° troughing angle may be chosen only in special application in consultation with the system designer/supplier.

4.3 *Angle of Tilt* (ψ) *of Side Idlers* — Shall be chosen as a function of the troughing angle (λ) and the belt speed, and shall be as small as practicable and in any case shall not be more than 3° (*see* Fig. 1).

Note 1 — The angle of tilt (ψ) of side idlers shall be in the direction of the belt run for the unidirectional conveyors and it shall be zero degree for reversible conveyors.

Note 2 — It is not obligatory to provide angle of tilt unless specifically desired by the purchaser. Angle of tilt on the side idlers may be eliminated by using training idlers or side rollers.

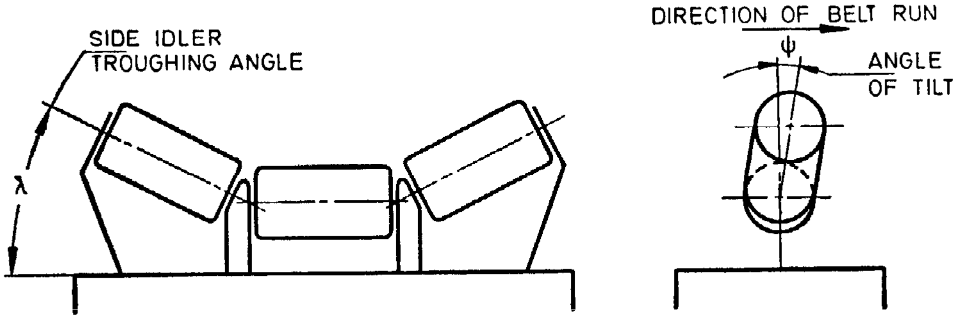


FIG. 1 TROUGHING ANGLE AND ANGLE OF TILT FOR SIDE IDLERS

4.4 *Arrangement of in-line and Staggered Carrying Idler Sets*

4.4.1 Troughed carrying idler sets built up from three idlers may be arranged with the idlers in-line or staggered as shown in the plan view in Fig. 2.

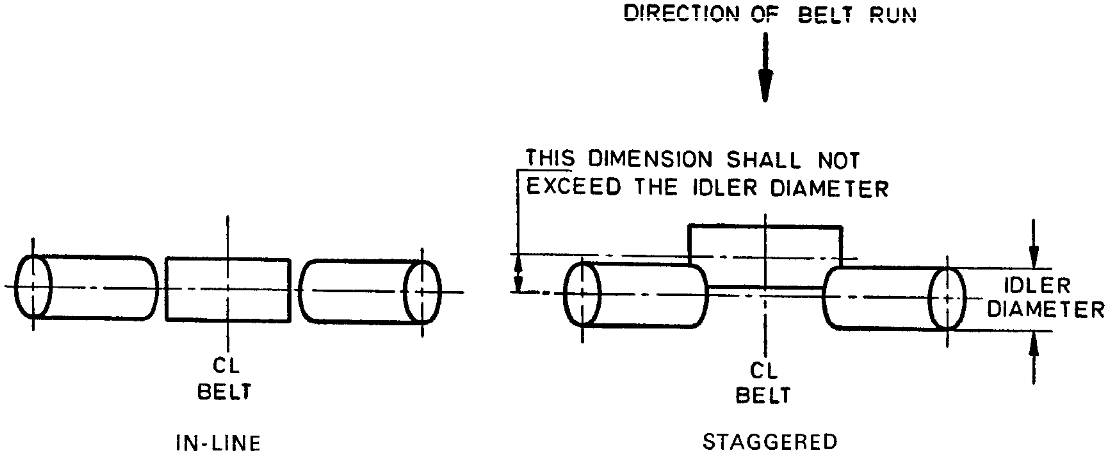


FIG. 2 PLAN VIEWS OF IN-LINE AND STAGGERED CARRYING IDLER SETS

4.4.1.1 When staggered, the displacement of the axis of the centre idler from the adjacent axis of the side idlers shall not exceed the diameter of the idlers.

4.4.2 Staggered carrying 3-idler sets shall be arranged with adjacent ends of side idlers and centre idlers overlapping by a minimum of 10 mm when measured as indicated in Fig. 3.

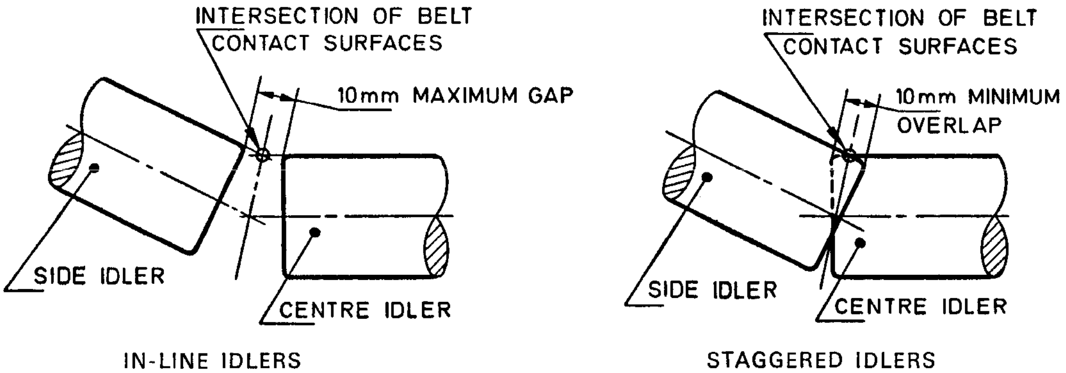


FIG. 3 ARRANGEMENT OF IDLER SETS VIEWED IN VERTICAL PLANE

4.4.3 The gap between the adjacent ends of the centre and side idlers of an in-line 3-idler set shall not be greater than 10 mm when measured as indicated in Fig. 3.

Note — In order to comply with this condition, it may be necessary, in certain cases, to adopt minor modifications in design, such as rounding or chamfering of spindle ends or to reduce dimension *n*. In any case, the value of *n* shall not be less than 4 mm.

4.4.3.1 Whenever it is not feasible to achieve this gap of 10 mm due to end details of idlers, in case of idler diameter of up to and including 108 mm, the maximum permissible gap between rolls may be increased to 23 mm.

4.5 *Run-out* — The idler outside diameter, measured by a dial test indicator at any point along its length when rotated on its own bearings, shall not exceed the total indicator reading (TIR) of 1·6 mm for idler lengths below 1 350 mm and 2 mm for idler lengths of 1 350 mm and above.

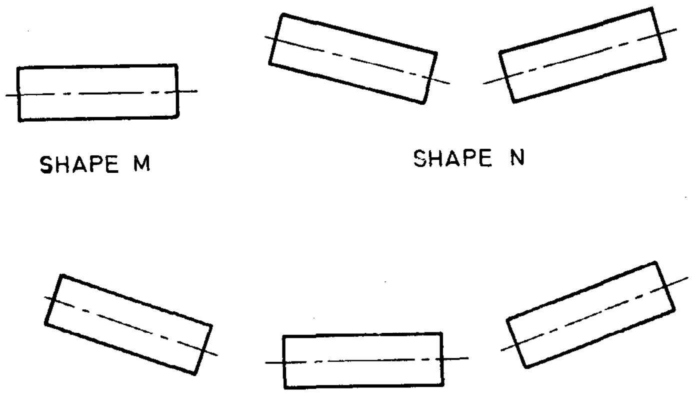
4.6 *Idler Bearings* — Unless the purchaser specifies a longer minimum rated life, the minimum design rated life for the idler bearings shall be 25 000 hours for bearings lubricated for life as well as intermitently lubricated bearings.

4.7 Steel tubes used in the manufacture of idlers and idler sets shall conform to IS : 9295-1983 'Specification for steel tubes for idlers for troughed belt conveyors (*first revision*)'.

4.8 Tests, process of construction, specific materials and other requirements in view of the application, environmental and meteorological conditions of use of the idlers/idler set shall be as agreed to between the manufacturer and the purchaser.

5. Designation

5.1 *Shape of Idler Set* — Idler sets in terms of shape shall be designated as *M, N* and *P* indicated in Fig. 4.



SHAPE M

SHAPE N

SHAPE P

FIG. 4 SHAPE OF IDLER SET

5.2 *Designation of Idler* — An idler of diameter d_1 of 133 mm, of length 1 000 mm, with spindle end of Type *A* with d_2 of 25 mm shall be designated as:

Idler 133 × 1 000 *A* × 25 IS : 8598

5.3 *Designation of Idler Set* — An idler set of shape *N*, diameter d_1 of 133 mm, length 1 000 mm with spindle end of Type *A* with d_2 of 20 mm shall be designated as:

Idler set *N* 133 x 1 000 *A* x 20 IS : 8598

6. Marking — The idlers shall be marked with diameter, length, manufacturer's name, initials and/or his recognized trade-mark.

6.1 *Standard Marking* — Details available with the Bureau of Indian Standards.

EXPLANATORY NOTE

This standard was first published in 1977. This revision has been undertaken to incorporate a number of changes based on the experience gained in the use of idlers and idler sets.

In the preparation of this standard, assistance has been derived from the following:

ISO 1537-1975 'Continuous mechanical handling equipment for loose bulk materials — Troughed belt conveyors (other than partable conveyors) — idlers', issued by the International Organization for Standardization (ISO).

BS 2890-1973 'Specification for troughed belt conveyors', issued by the British Standards Institution (BSI).

DIN 15207 and DIN 22107, issued by the Deutsches Institut für Normung (DIN).

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